Abstract

Optical fiber terminations requiring collimated output from single-mode fibers (SMF) have been accomplished in the past through use of graded index lens (GRIN) technology. GRIN lenses are expensive, difficult to mount and align, require adhesive bonds, and are relatively large compared to the optical fiber diameter. The use of a UV laser refractive index tunable fused multi-mode fiber as a termination collimator provides a more compact, durable, inexpensive means of coupling single-mode optical fibers to other components, even those of uneven numerical aperture. Determining the exact length required for proper collimation is avoided by utilizing a laser tuning process to adjust the refractive index of the fiber to produce required collimation.

This novel composition and method comprises the use of a germanium-doped multi-mode optical fiber as a collimating termination for a single-mode optical fiber. The collimating termination fiber is normally fused to the single-mode fiber. The required length of the multi-mode fiber is estimated prior to fusing to the SMF, and the refractive index is tuned by exposure to UV radiation via a laser to produce full collimation. Embodiments of this invention include switching devices using solenoid driven shutters and movable optical prisms.